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SCIENCE

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WILLIAM JAMES

CONTENTS

<i>William James: DR. HENRY RUTGERS MARSHALL</i>	489
<i>Surface Tension in Relation to Cellular Processes. II: PROFESSOR A. B. MACALLUM</i> ..	492
<i>The Eighth International Zoological Congress: PROFESSOR CHARLES L. EDWARDS</i> ..	502
<i>Scientific Notes and News</i>	504
<i>University and Educational News</i>	508
<i>Discussion and Correspondence:—</i>	
<i>Amoeba meleagridis: DR. THEOBALD SMITH.</i>	
<i>Winchell on Ophitic Texture: PROFESSOR ALFRED C. LANE. The Reform of the Calendar: PROFESSOR ANDREW H. PATTERSON</i>	509
<i>Scientific Books:—</i>	
<i>Physical Science in the Time of Nero: BROTHER POTAMIAN. Allen's Commercial Organic Analysis: PROFESSOR W. A. NOYES</i>	515
<i>Scientific Journals and Articles</i>	516
<i>Notes on Entomology: DR. NATHAN BANKS</i> .	517
<i>Special Articles:—</i>	
<i>The Selective Elimination of Organs: DR. J. ARTHUR HARRIS</i>	519

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THOSE who had known William James only through his writings must have felt no little surprise to learn that he had all but reached his sixty-ninth birthday, and that he had for many years been made painfully aware of the organic trouble that finally took him from us. For during these later years of his life his most telling writings had appeared in rapid succession; writings so full of the spirit and vigor of youth that it was difficult even for his friends to realize that he was approaching the limit of three score years and ten, and that infirmity threatened him.

These later years, as all his readers know, were devoted to the promulgation of certain metaphysical doctrines, and it is indicative of the persuasive power of the man that the audience gained by him among men of science in the beginning of his career was not lost when he asked them to consider subjects usually looked upon as quite foreign to their mode of thought.

For it must be remembered that he made his first impression as a man of marked ability among scientific men. He was educated in the Lawrence Scientific School. He accompanied Agassiz on one of his scientific expeditions. He took the degree of doctor of medicine at the Harvard School, and shortly after devoted some years to the teaching of physiology. And it was in connection with physiological studies that we first have indications of a fully awakened interest in the nature of the mental changes that accompany bodily activities. In his early psychological essays, such for instance as those on instinct and habit, and in his later

emotional theory, we see the predominant influence of his physiological studies; and his insistence upon the foundation of a psycho-physical laboratory in connection with his university tells the same story.

He had, to be sure, no mean artistic endowment, as was indicated by the promise of his youthful work as a student under masters of painting; and fully demonstrated in the inimitable literary quality that made his writings in diverse fields so fascinating, and in the fertility of imagination displayed in every piece of work he undertook. Nevertheless, it is easy to see that, had the circumstances of his early years been but slightly different, he might very well have devoted his life to pure science alone.

Even when he finally turned his energies to the study of the fundamental problems upon which all science must in the end be based, he held his hearers and readers, not only by his matchless mode of expression, nor only because of the keenness of his criticism and the value of his teachings, but also in large part because his utterances were appreciated to be those of a man who exemplified to the full the attitude of the faithful devotee of science.

In fact, as I think of his work as a whole, I am prepared to believe that his readers of the future will find his most striking traits to have been the very ones that men of science hold as their ideals; viz., an intense interest in investigation in all matters to which his attention was turned; and an equally intense devotion to the search for truth, with which was joined an unwillingness to treat lightly any data whatever that might possibly be found to be significant.

And yet it has become apparent to us today that he was first and foremost a psychologist. And to service in that field he devoted all of the artistic gift that was his, and all the powers that he had gained in

the study of the more rigid sciences: and had he ceased writing twenty years ago, when his masterly "Principles of Psychology" appeared, he would perhaps have been known only as James the psychologist.

That he was the ablest and most influential psychologist of our time can not be questioned; and I am inclined to agree with Professor Dewey that men of future generations may look upon him as the greatest psychologist that has ever lived.

His work, it is true, was not, strictly speaking, systematic. As he wrote to me in one of his familiar letters, he always found it necessary "to overcome a certain primary repugnance for everything put in abstract and schematic shape." But this, after all, was natural to a man of his temper. For the system-maker, dealing as he does with broad generalizations, must inevitably fail to cover by his formulations many details that are imperfectly comprehended; and must be constantly tempted to pass these by as less significant than they really are. For James these very obdurate details had especial interest. He delighted to lay them bare even though they could not be systematized: and being the soul of candor, he found himself utterly incapable of hiding from his fellows any insight that he had gained through his exceptional powers of analysis, which often brought to light a multiplicity of interesting elements in what had too commonly been assumed to be unanalyzable. These acute analyses, so constantly illustrated by reference to concrete instances, have furnished to the psychologist of the future the richest of data, a veritable mine of wealth for the scheme maker of a later day.

During the last years of his life, however, James, in his published writings, dealt especially with subjects philosophical rather than psychological. But even in this realm which the man of science hesi-

tates to enter, we still feel the influence of his scientific predilections in the emphasis he gave to a "radical empiricism," and in his vigorous attacks upon the monistic philosophers whom he accused of blinding themselves to the vast variety within experience in their efforts to find unity in what he believed to be really a "pluralistic universe."

In this philosophical field his work was on the whole less constructive than critical. But his criticism was so cogent, and was driven home with so much power, that even those who were altogether out of sympathy with his general philosophical position were compelled to listen with attention and respect.

His name has of late come to be inseparably connected with the philosophical tenet known as pragmatism. Although it is true that the first formulation of this doctrine was due to Charles Peirce, as James himself took every opportunity to explain; and equally true that its acceptance has been implicit in the writings of many of our philosophical fathers, as James also acknowledged in calling it "a new name for some old ways of thinking": nevertheless, it must be acknowledged that it is due mainly to his brilliant expositions, that the importance of the doctrine has become so evident that it can never again be overlooked as it has been in the past.

The full significance of this doctrine can not yet be fairly estimated. James himself was ready to acknowledge this; and his latest book "The Meaning of Truth" contains many indications that, as his thought developed, he was gaining new light in regard to the implications of the postulate. Whatever it may in the end have to say of "the eternal verities," it at least teaches us that we accept a conception as true just so long as it is "workable"; that our conceptions of truth are relative to the uses

to which these conceptions are put; a fact which surely implies that doubt indicates no more than our discovery that these conceptions are not thoroughly "workable," and that modifications of them which shall be closer to reality are required if they are to maintain their full value in our lives.

This teaching, if once firmly grasped, is seen to have bearings that reach quite beyond the realm of theoretical metaphysics, having special importance in the field of concrete ethics; and I am convinced that, had his life been spared, James would surely have laid stress upon the ethical implications of the doctrine he so persistently pressed upon us. For no one could come to know James even casually without feeling that he was in the presence of a man of unusual moral force. In fact, no one can read far in his pages without gaining this same impression, which was especially exemplified in such books as his "Will to Believe and other Essays on Popular Philosophy," and his "Talks to Teachers on Psychology and to Students on Some of Life's Ideals." He never posed as an ethical teacher, to be sure, nor was he given to sermonizing; yet his readers were uplifted as they breathed, as it were, the moral atmosphere in which his thought moved.

It is not surprising then that a man of this nature should have taken a very deep interest in the phenomena of religious life, which yielded that remarkable series of Gifford lectures later published under the title of "Varieties of Religious Experience." Had James written no other work, his life would have been a notably efficient one. In this book he gathered together the results of the investigations of others, and of his own keen observations; and placed these results before his readers in a form so persuasive, and withal so reverent, that while, on the one hand, he aroused no hos-

tility among the dogmatists, on the other, he led many men who had been driven from the churches to realize the deep significance of religion in their own lives.

Perhaps no other one of his books shows so fully the character of the man as he was known to his friends; and after all it was his character, as divulged in his writings, that made his life so influential. He was a true representative of that spirit of liberty which led to the foundation of the New England Colony, and which has been so potent in shaping the destinies of his native country. He rejoiced that he and his fellows did not have to meet the pressure of the social order which so hampered the lives of those born on foreign soils. He was the strongest of individualists, firm in his belief in the right of the individual to develop himself in the manner of his own choosing; a belief which found expression on the philosophical side in his "Pluralistic Universe," and on the practical side in his opposition to the imperialistic tendencies developed in this country in connection with our acquisition of the Philippine Islands.

And it was this general attitude of mind that yielded that depth of sympathy with all sorts and conditions of men which was so fully exemplified in his "Varieties of Religious Experience" above referred to.

Here was a man upon whom had been showered the highest of honors by societies of learned men the world over; who nevertheless remained as modest as a child; ever eager to learn from the humblest human soul the secrets of its innermost nature; and ever ready to acknowledge the limitations of his own insight. Referring to a little discussion between Schiller and myself a few years ago, he wrote to me, "I don't fully understand Schiller's position, or yours;—or my own, *yet*." How could we think of him as anything but young,

who maintained to the end such open-mindedness, such mental plasticity. How could we fail to honor a man who displayed such intellectual integrity.

I can not close this inadequate survey of the life work of my beloved friend and master without a word of personal tribute which I doubt not will find an echo in the thought of very many others. But for his interest in some crude work of mine in my youth, and before we had ever met, I should probably never have discovered that I had in me the capacity to think or write anything that might be worthy of the attention of any psychologist. To this one kindly act I can trace the development of a side of my nature which has given life for me a special interest it could not otherwise have had. And during the years that followed he never missed an opportunity to write a word of encouragement whenever any work of mine appeared to him to have a shred of value. What he did for me he doubtless did for many another. We have lost an inspiring master. But more than that we have lost an ever faithful and beloved friend.

HENRY RUTGERS MARSHALL

SURFACE TENSION IN RELATION TO CELLULAR PROCESSES. II

The first to suggest that surface tension is a factor in muscular contraction was D'Arsonval, but it was Imbert who, in 1897, directly applied the principle in explanation of the contractility of smooth and striated muscle fiber. In his view the primary conditions are different in the former from what obtain in the latter. In smooth muscle fiber the extension is determined, not by any force inside it, but by external force such as may distend the organ (intestine, bladder and arteries) in whose wall it is found. The "stimulus" which causes the contraction increases the